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| 10/562,265 | 05/24/2006 | Masatomo Sumiya | 283485US0PCT | 7862 |
| 22850 | 7590 | 01/21/2009 | | |
| OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | | |
| EXAMINER | | | | |
| LEONG, NATHAN T | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 1792 | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/562,265

Applicant(s)

SUMIYA ET AL.

Examiner

NATHAN LEONG

Art Unit

1792

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) 5-7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SE-08)
- Paper No(s)/Mail Date 3/28/2006
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of claims 1-4 in the reply filed on 12/11/2008 is acknowledged. The traversal is on the ground(s) that there are no adequate reasons and/or examples provided to support the distinctiveness between the groups, and also that no burden exists in the search between the two groups.. This is not found persuasive because adequate reasons for the restriction were provided in the lack of unity explanation on page 2 of the restriction requirement in that there is no shared special technical feature between the two groups.

In regards to the second argument that there is no search burden, unity of invention and PCT restrictions do not require search burden in a restriction, see MPEP 1850. Even if a search burden were required, Examiner believes there would be a search burden between the groups as one is drawn to a method, and the second is drawn to a device.

The requirement is still deemed proper and is therefore made FINAL. Claims 5-7 are withdrawn from consideration.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention. Claim 1 recites the phrase "low temperature process", however the exact metes and bounds of this is uncertain.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Yuasa et al US 2002/0048964.

Per claim 1, Yuasa teaches the method for growing a thin nitride film (GaN) over a sapphire substrate (see abstract and [0006]). Yuasa teaches a growth temperature of about 600°C, with an addition of an acidic solution at 200°C [0057]. Since these temperatures are less than the "conventional high-temperature nitriding" process taught in applicant's specification [0024], Examiner has interpreted these temperatures to be at a low temperature.

Yuasa teaches forming a mask of SiO₂ over the GaN film [0006] for the purpose of selective growth of the GaN film. Since SiO₂ deposited on the nitride film has a different polarity than the GaN, one performing such a method would thereby inherently control the polarity of the thin nitride film. In addition, the etching process described by Yuasa (see [0035] and Fig. 1A-1D) show that one would use etching (using an acidic solution, see below) to form a pattern of the GaN layer 102, and since the sapphire

substrate has a different polarity from the GaN film, one performing such a method would thereby inherently control the polarity to the thin nitride film.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuasa et al US 2002/0048964 in view of Tsuda et al US 6335546.

Per claim 3, Yuasa teaches the acidic solution to be nitric acid [0057]. Per claim 4, Yuasa teaches using a mask to form a pattern of GaN (see [0006], [0007]) and then growing a nitride film through the patterned mask.

Per claims 2-4, Yuasa is silent about cleaning the substrate with H₂ cleaning. However, Yuasa does teach cleaning the substrate before the formation of the film [0042]. Tsuda teaches a similar process of forming a nitride film used in

semiconductors on a sapphire substrate, but additionally teaches cleaning the substrate prior to the growing step with an H₂ stream (col. 9, lines 45-53). Although Tsuda teaches the cleaning step at an elevated temperature, the instant claims as written do not require that the cleaning step be performed at a low processing temperature. In addition, the cleaning step occurs before any growing/chemical interactions take place, and therefore would have little effect on the growing process. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process of Yuasa by using H₂ cleaning as taught by Tsuda because H₂ gas is a cheap and readily available substance, and also H₂ cleaning has been used in a similar process and shown to be effective (see Tsuda), and therefore one of ordinary skill would have the desire to clean the substrate with a known method to minimize undue experimentation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN LEONG whose telephone number is (571)270-5352. The examiner can normally be reached on Monday to Friday, 7:30am to 5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571)272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/NATHAN LEONG/
Examiner, Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792